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Bush and Science: Maybe 1990 Will Be Better

George Bush didn't promise much in the science-policy area during his run for the White House, and, after a year in office, he hasn't delivered much—in fact, even less than promised.

This should not be surprising in the mature age of the televised presidency, in which talented assistants diligently plot and strive to get the boss on the evening news. TV time and therefore political mileage are to be gained by exploiting the flag and the pledge. And there's profit to be had from John Wayne-ish vows about the war on drugs and reverential talk about education, no matter how empty.

But that's not so with the ups and downs of the National Science Foundation, the weak relationship between government-funded research and industrial capability, the numerous senior vacancies in major research agencies, the Pentagon's hogging of federal R&D funds, and so on. All these are

the senior ranks of federal R&D administration and advice. Thus, the directorship of the National Institutes of Health has been vacant since August. And though it's prudent to recognize that an appointment could be announced at any moment, the word in Washington biomedical circles is that a selection won't be made until spring. There is no board of trustees in the private sector that would tolerate a vacant CEO post in a \$7.5 billion operation, but the White House doesn't seem fretful about the NIH vacancy.

The directorship of the Centers for Disease Control went unfilled for nearly a year, until the recent appointment of William L. Roper, who's been in charge of health policy on

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obscure matters, below the threshold of broad public attention. And they therefore don't rank high in presidential attention, because the public isn't going to rise in anger over federal fellowship policies or similarly arcane issues.

When the general press does take up science-policy, it's often in the context of the economic and business implications of federal R&D activities. Otherwise, the subject exists in a kind of journalistic eclipse, followed mainly by a specialized, small press corp, and little-noticed beyond the boundaries of the scientific community.

In these circumstances, the Bush Administration's neglect of the national scientific enterprise has proceeded with little critical attention. An additional reason may be that in good and bad seasons, the leadership of the scientific community indiscriminately emits apocalyptic howls about money, and has thereby desensitized many who might help. But the fact remains that the national science enterprise was a neglected orphan in the first year of the Bush Administration, and there's no sign to date of an awakening of Presidential interest.

Lacking that interest, the Bush Administration has mainly glided along with the R&D programs and policies it inherited from the Reagan era—which means devotion to colossally expensive mega-projects, an avoidance of priority making, and an indifference to the financial squeeze that must inevitably arise from trying to do it all in the Gramm-Rudman environment.

To this it has added the phenomenon of empty chairs in

In Brief

Another job may be ahead for ex-NIH Director James Wyngaarden. Forced from NIH by the Bush Administration, he surprisingly reemerged at the White House Office of Science and Technology Policy (OSTP), where since December he's been Assistant Director for Biomedical Affairs. Now he's a candidate for Foreign Secretary of the National Academy of Sciences, and says he'll quit OSTP if elected. Wyngaarden says he discussed his candidacy with OSTP Director D. Allan Bromley before taking the OSTP job. The other candidate for the NAS post is Rudi Schmid, of UC San Francisco. Votes will be counted at the end of January. The winner takes office in July.

In an unpublished survey, the Industrial Research Institute asked representatives of its 257 research-intensive firms to state their personal priorities on five R&D "mega-projects" on the federal agenda. The winners, in order of most-favored: Human Genome Project, Hypersonic Airplane, Space Station, Strategic Defense Initiative, and Superconducting Super Collider. The survey will be discussed at a meeting February 5 at IRI's Washington headquarters.

R&D spending in the US will rise this year by a real 2.1 percent, dropping from an average increase of 3.1 percent over the past decade, according to the annual forecast of the Battelle Memorial Institute. Spending by industry was forecast at \$67.7 billion, an annual increase in current dollars of 5.8 percent, while federal spending was forecast at \$64.9 billion, up 3.5 percent.

Coming up when Congress returns: A close look at the Pentagon's sprawling research empire by the House Armed Services Research and Development Subcommittee, chaired by Rep. Ronald V. Dellums (D-Calif.) The focus will be on DoD's colossal R&D budget—\$40 billion this year—in the new era of east-west amity.

... Many Senior R&D Positions Are Still Vacant

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the White House staff.

In the Commerce Department, the post of Under Secretary for Technology remains vacant. Created over Reagan's opposition by Congressional Democrats who intended it as a focal point for supportive government links to civilian industry, the job is situated in the limbo-land of the Bush Administration's indecisiveness about industrial policy. At least one accomplished veteran of high-tech industry, Tom Vanderslice, formerly of Apollo Computers, has turned it down. The latest word at the Commerce Department is that the Administration has decided on another candidate for the job, Robert White, of Control Data, but there's nothing official on that.

At the Department of Energy, the Office of Energy Research, which runs most of the Department's basic-science programs, has been without a chief since the forced resignation last fall of Robert O. Hunter.

On the eve of the Administration's first anniversary, the White House Office of Science and Technology Policy (OSTP) lacks two of the four assistant directors in its staff organization. The choices are reported to be Eugene Wong, of UC Berkeley, and William Phillips, a veteran industrial research administrator who heads the Missouri Advanced Technology Institute. Their nominations are not expected in the Senate until after Congress returns on January 23; they will no doubt be confirmed, but when is not certain.

The OSTP Director, D. Allan Bromley, wasn't nominated until April and, with one delay and another, didn't take office until August. Bromley has proudly announced that OSTP will be buttressed by a Presidentially appointed Council of Science and Technology Advisers. The Council has apparently been designed, for function and status, along the lines of the long-gone President's Science Advisory Committee—nostalgically recalled by the old timers of White House science advice as the centerpiece of a golden age, until Richard Nixon wiped it out. However, as the first anniversary of the Bush Administration approaches, the Council has not been appointed.

There's usually a story attached to each vacancy: the most-desired candidate couldn't afford the move to Washington's costly housing and relatively low wages. Or, as in the case of the NIH Director, the recruit was repelled by a real or imagined "litmus test" on abortion. Then, too, there are galling delays arising from the exhaustive security checks designed to keep out miscreants who, if uncovered, might be excessively embarrassing for the President.

Nonetheless, when it's all added up, the striking conclusion is that Bush and his inner circle are not especially concerned about the managerial condition of the federal research establishment or a quest for rational use of R&D resources in a time of financial difficulties. What are the R&D priorities of the Bush Administration? The question has often been asked of Administration officials at Congress-

sional hearings, and is yet to be answered.

The basic issue, of course, is whether the White House's inattention and all those empty chairs really matter, or is it the case that *laissez faire* is best in research policy and research agencies more or less run smoothly without too much administrative attention? No calamities are known to have ensued from the Presidential neglect of science-related issues. But signs of drift and confusion are abundant and there have also been missed political opportunities for moving toward goals that are generally regarded as desirable.

Bush, for example, endorsed the five-year Reagan plan for doubling the NSF appropriation by 1992. But when a Congress weary of budget battles found it easy to snip at NSF in favor of housing and veterans health care, the Bush Administration didn't rush to the aid of the Foundation. The doubling goal, which also slipped under Reagan, is now defunct, though it still exists in official pronouncements.

NSF Director Erich Bloch, in the final year of his six-year appointment, has been edging closer and closer to outright criticism of his Administration's science policies, especially for its apparent indifference to the huge long-term mortgage implicit in the startup of several big-science projects.

In an interview in SGR (September 15, 1989: "DOD Share of Research Too Big, NSF Head Says"), Bloch questioned the Administration's pace of spending on several mega-projects, including the Space Station, the Human Genome Project, and the Superconducting Super Collider (SSC). Stating that NSF, for lack of money, is "turning down good projects," he suggested a throttling back on the pace of big-project spending and more emphasis on international cost-sharing. "I don't think we can afford these things on a national basis any longer," Bloch said.

Bloch hasn't indicated whether he's interested in another term as NSF Director, but associates at the Foundation say he's frustrated, even angered, by the paradox of effusive political praise for NSF and its various programs, and limp political support for raising its budget in big steps rather than

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... Indecision on Federal Role in Industrial R&D

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the customary small increments.

The issue of the appropriate federal role in civilian technology remains muddled in the upper echelons of the Bush Administration. In December, rumors spread that the Defense Department planned to drop its \$100-million-a-year subsidy for Sematech, the 14-firm consortium for research on semiconductor manufacturing. The reports were promptly denied following warnings of even further collapse in that important industrial sector if the Pentagon pulled out. But the original report had an aroma of authenticity, and the leak may have been a preemptive move against elimination of the subsidy.

Still unsettled is the fundamental question of the extent of federal responsibility for the health of high-tech industry. The newly issued *National Action Plan on Superconductivity Research and Development* (see In Print, Page 8) reflects the Administration's disordered thinking about this issue. "The Nation's success in commercializing superconductivity," it states, "ultimately depends on the private sector, which must make the critical decisions on how much capital, time, and effort to invest. Yet the challenges are so large and the potential is so great that federal vision, leadership, and support are warranted to ensure our Nation's stake in the outcome." Under that elastic mandate, anything goes.

Meanwhile, the Space Station has emerged as the largest single item in the NASA budget, accounting for \$2.05 billion in fiscal 1990 out of a total NASA budget of \$13.3 billion. Though the Administration's original request for the Space Station was clipped \$250 million in Congress, the appropriation for the project has nonetheless doubled in just one year. While the spending zooms and a constituency is created for even greater spending, still lacking is a rationale for proceeding with the venture. The industries that are supposed to relish experimentation and manufacturing in zero gravity have been very stingy about putting up their own money for the Space Station.

The Space Station as a step toward manned exploration of Mars is one of the recurring pipe dreams of space romantics, but even the Bush Administration has been extremely wary about getting near that fiscal trap. NASA sought \$127 million this year for what's known as the Pathfinder Program, aimed at developing technologies for human presence beyond earth orbit. Reflecting Congressional doubts about space strategy, the Senate voted zero for Pathfinder, but in the end the program got \$35 million.

The big factor today in space politics is Vice President Dan Quayle's chairmanship of the National Space Council. In his quest to shed his vapid image and acquire a credible political identity, Quayle has cast himself as the champion of super high-tech programs. He's credited with saving the National Aero-Space Plane from budget oblivion, thus building a reputation as the insider who can promote big space spending. This is advantageous for Quayle, but his tunnel-

visioned promotion of space takes no account of other scientific and technological needs.

Though the Bromley science-advisory shop was late in getting started and still has a way to go on staffing, its presence is potentially the big difference between years one and two in the Bush Administration's handling of R&D matters. Bromley has spoken generally in behalf of scientific priority-making—abhorrent to many scientists, since they want it all. And he has suggested that the mega-projects may, of fiscal necessity, have to be throttled back. He conveys the importance of making sensible choices when we can't have it all.

By Bromley's account, in carefully parceled out interviews in various publications, he and his OSTP staff have been brought into close collaboration with the Office of Management and Budget. However, his influence in financial and other matters is yet to be publicly revealed. Bromley, for example, has acknowledged that Secretary of Health and Human Services Louis W. Sullivan did not consult him in extending the Reagan Administration's ban on federal funds for experimentation involving fetal tissue (SGR, December 1, 1989: "Science Advice: Dr. Bromley, Meet Dr. Bromley").

Many revealing signs will be found in the Bush budget for fiscal 1991, due out at the end of this month. The first budget wholly prepared by the Bush Administration—the one issued last year was a lightly reworked version of the final Reagan budget—it can reflect the beginning of a design for federal R&D affairs. Or it can continue the tradition of muddling along.—DSG

US and Soviets Agree to Revival of Oceanographic Research Cooperation

A major agreement on cooperation in oceanographic research has been arrived at by Soviet and American negotiators, thus reviving a relationship that was put on hold by the US after the Soviet invasion of Afghanistan in 1979.

The agreement reflects the growing warmth of Soviet-American relations, as well as the stiffening US insistence on protection of intellectual property rights in scientific and technical dealings. According to an announcement from the National Oceanic and Atmospheric Administration, which negotiated the agreement, "Unlike its predecessor... this agreement makes explicit provisions for allocation of so-called intellectual property rights—patents, copyrights, and trademarks—that might be developed in the course of research cooperation."

Titled the Ocean Studies Agreement, the new accord provides for collaboration in a wide range of activities, including reciprocal availability of port facilities in connection with joint research projects. Listed as initial projects were Southern Ocean dynamics, Mid-Atlantic Ridge crest processes, geochemistry of North Pacific sediments, and Arctic erosional processes.

Prodged by Dingell, NIH Studying Gallo AIDS Role

The management of the National Institutes of Health has replied cagily to Rep. John Dingell's request for a response to the *Chicago Tribune's* voluminous and denigrating report on the scientific integrity of NIH's leading AIDS researcher, Robert Gallo.

The answer, from the Acting Director of NIH, William F. Raub, came December 22 in a letter stating that "the preliminary analysis by the National Cancer Institute [where Gallo works] indicates that the article presents no new information and, in fact, in many places is inaccurate, incomplete, or otherwise seriously misleading." However, in accordance with NIH procedures, the Cancer Institute is still looking into the case, Raub assured the Congressman. An aide to Raub declined SGR's request for identification of the alleged shortcomings in the newspaper's article.

The *Tribune* report is by John Crewdson, who won a Pulitzer Prize in 1981 while with the *New York Times*. Running 50,000 words in a 16-page section published November 19, it states that Gallo's claimed discovery of the AIDS virus "was either an accident or a theft." In support of that allegation, Crewdson quotes numerous documents and interviews with scores of scientists and technicians, most to the point that Gallo filched the virus identification from his rival at the Pasteur Institute, Luc Montagnier. Gallo has dismissed Crewdson's charges as "an old broken record," and told SGR that he hasn't read the *Tribune* article and doesn't intend to (SGR, December 1, 1989).

Under pressure from President Reagan and Prime Minister Jacques Chirac, the two scientists agreed in 1987 to share priority, and also to refrain from further public discussion of the controversy. But that didn't quell the rumor mill in scientific circles, where Gallo is renowned as a talented researcher with a craving for glory.

The Crewdson report was two years in preparation, an extraordinary duration in the hurry-up world of daily journalism. Carefully written, and extensively documented, it compels attention as a serious inquiry into a matter that has raised concern, and cynical comment, among knowledgeable researchers. As such, the report was red meat for Dingell (D-Mich.), who's been on the science-fraud trail since 1986, when he encountered the celebrated dispute involving allegations of knowingly tolerated error in a paper co-authored by Nobelist David Baltimore.

Dingell's letter to Raub is a typical Congressional shotgun blast fired off in the hope of hitting something. In the genre, it hints at knowledge of dark deeds, noting that "Previous investigations by the Subcommittee staff have indicated that in the past NIH has turned a blind eye to misconduct by senior scientists supported by Federal funds. We trust that this will not be the case in the present situation, and that the allegations will be thoroughly investigated and appropriate actions taken if warranted. . ."

The reply by Raub reflects his seasoning in dealing with the Congressional tactic—mainly by ignoring what might

be difficult to handle.

Thus Dingell, possibly responding to rumors of an earlier but unannounced NIH look at Gallo's operations, asked in his letter to Raub: "Has NIH been aware of the evidence published in this recent account [in] the *Chicago Tribune*? Has NIH investigated any of these allegations? If so, please specify which allegations were investigated, the findings of those investigations, the factual basis for the findings, and copies of any reports."

Dingell's letter continued in that vein: "What allegations and concerns raised in the article, if any, have not been investigated? If they have not been investigated, does NIH plan to conduct an investigation of these allegations? If so, what office and persons at NIH will be involved in performing the inquiry, and what procedures will be used? When will the inquiry start and what is the estimated time for completion?"

Raub's reply to the barrage was sparse and selective, ignoring the inquiry about NIH's prior knowledge of Crewdson's charges and the query "has NIH investigated any of these allegations?"

After spelling out NIH's administrative procedures for investigating misconduct charges in the intramural program, Raub went on to his remarks about the "preliminary analysis" casting doubt on Crewdson's allegations. He continued: "Once the NCI analysis is complete, the DDIR (Deputy Director for Intramural Research) and the Acting Director, OSI (Office of Scientific Integrity), will review its findings and supporting documentation and, in consultation with me, determine the next steps."

Since there can be no doubt that Dingell looks with cynical amusement on a process wherein NCI investigates the integrity of NCI's star AIDS researcher, Raub volunteered: "Be assured that the DDIR and the OSI are prepared to undertake whatever fact-finding and investigative steps are necessary over and beyond those of the National Cancer Institute to ensure a proper response to the serious charges inherent in Mr. Crewdson's account, including contacting individuals and institutions outside the NIH."

The Gallo inquiry is as welcome at NIH as a major budget cut. Gallo is both loved and hated, and whichever way it comes out, many will be angry. Acting Director Raub is a dark-horse candidate for Director—he's a PhD, and MDs have had a lock on the top job at NIH and its predecessor agency since 1887.

Raub has a chance, however, since relatively low pay, uncertain influence and the abortion issue have reduced the job's luster. But a misstep by Raub in handling the case could bring on the wrath of Dingell, who chairs the House Energy and Commerce Committee, which has jurisdiction over NIH. At this point, the investigative system is grinding on and there's no turning back.

The outcome could be an inconsequential fizzle or a profound embarrassment for American science.—DSG

Lobbyists Squelch NIH Conflict-of-Interest Guides

A lobbying campaign in a political atmosphere that venerates personal pursuit of wealth succeeded last month in canceling proposed federal guidelines to restrain the gold-rush spirit that's infesting biomedical research.

The triggerman was Secretary of Health and Human Services Louis W. Sullivan. And the hapless target was the National Institutes of Health and its sister agency, the Alcohol, Drug Abuse, and Mental Health Administration. The guidelines—merely advisory, rather than mandatory, and therefore toothless—were aimed at conflicts of interest involving relationships between NIH and ADAMHA grantees and commercial enterprises.

Drafted in response to Congressional pressures, the guidelines would have prohibited grantees of the two agencies from holding stock in firms that would benefit from their research and also from serving as paid consultants for companies whose products they are evaluating. In addition, it would have prohibited researchers from sharing information with companies paying them unless the information had already been made publicly available.

The underlying theme of the guidelines is vintage populist stuff—namely, that private profit seekers should not be permitted to corner public property and that goodies produced with tax funds belong to the taxpayers. The sins that the guidelines were intended to forestall are commonplace in dealings between academic medicine and the pharmaceutical industry, which routinely rewards supposedly independent clinical researchers for conducting drug trials.

In announcing cancellation of the guidelines, HHS Secretary Sullivan said in a statement, "While there is a crucial need to protect against possible abuses in the research system, it is also important that we not impose on our scientific community regulatory burdens which may be unnecessary or counterproductive." Sullivan added, "Likewise, it is important that we not unnecessarily jeopardize the international leadership position we have built up through years of cooperative government and private investment."

Sullivan said he has directed NIH to prepare "options for addressing potential conflicts of interest that properly treat potential abuse while keeping the research process free of unnecessary burdens and disincentives." That prescription can be taken as a signal that nothing serious is to be done about the problems that the guidelines sought to address.

After a draft of the guidelines was sent in September to medical schools and other research-oriented institutions for comment, the opposition mobilized. In fact, for many of the lobbyists stationed in Washington by academic organizations, the guidelines became the number one issue. And forecasts of baleful effects were showered upon NIH in the anxiety-producing style common to the lobbying craft.

Typical of these productions were the comments of the Federation of American Scientists for Experimental Biology (FASEB), which warned that the guidelines "would be counterproductive to research, making it extremely difficult

for scientists to seek multiple sources of funding or to establish outside relationships which are critical to the success of their work." Addressing the provision concerning public release of information produced with federal support, FASEB stated: "While the intent of the language is laudable, it provided scientists with no guidance on how to adapt such a restriction to the modern research environment where private as well as public sources of support are necessary. If such a restriction were implemented without change, scientists would be reluctant to make even the most informal and benign contacts with industry."

FASEB then, in effect, advised abandonment of the guidelines, urging NIH and ADAMHA to "review existing laws, regulations and institutional policies and procedures to determine whether sufficient authority already is available to deal with conflicts of interest in research." FASEB was thus suggesting the possibility that NIH had entered into the guideline-writing exercise in ignorance of existing authority to deal with the problems addressed in the draft document.

But one of FASEB's six constituent societies did express concern about the hot commercial winds blowing on the culture of science. The American Society for Biochemistry and Molecular Biology endorsed the FASEB statement, but added that "the results of research funded fully by NIH, for example, are not being made available to the scientific community by traditional means... but instead are provided to companies for personal gain." The Society, however, expressed reservations about the efficacy of the guidelines for dealing with what it termed "this *real* conflict of interest," and called for rules "that deal with clearly inappropriate conflicts of interest without jeopardizing the types of scientific interchange that are so essential."

One of the few statements of support for the guidelines came from Public Citizen, the umbrella organization for Ralph Nader's enterprises, but it also expressed concerns that the guidelines are neither mandatory nor sufficiently tough. The statement also asserted that "NIH's proposal fails to utilize one very effective means of eliminating conflicts of interest, namely, public disclosure of such conflicts." The Nader response, signed by Sidney Wolfe, Director of the Health Research Group, and Patti A. Goldman, a staff attorney, speculated that without a mandatory conflict of interest prohibition for grantees, "NIH's own researchers, who are bound by mandatory standards, may be tempted to leave the government in order to perform similar research under NIH grants and contracts without being subject to binding conflict-of-interest restrictions."

It is not realistic to expect the Bush Administration to crimp the money-making spirit in science. But hearings held last year by Rep. Ted Weiss (D-NY) produced enough accounts of misdeeds with federally funded research to arouse interest for further examination of the situation.

The coming session of Congress can be expected to hear more sordid tales from the world of science.

Commerce Dept. Deputy Queries Foreign Role in US Schools

Excerpts from an address by Deputy Secretary of Commerce Thomas J. Murrin, a former Westinghouse executive, at the National Academy of Engineering Conference on National Interests in an Age of Global Technology, December 4, Irvine, California.

I don't think it makes good sense for us to sit here... without taking a very hard look at how the rest of the world is actually setting technology policy and conducting business. Our lofty philosophies have to be guided by pragmatic policies. . . . If we ask ourselves, "Are other nations acting as international 'citizens' or are they acting first in their own self-interest?" the answer is obvious. Witness Japan, which has been dramatically and effectively harnessing new technologies in their self-interest. . . . There is no doubt that we have lost commercial leadership in key industrial technology-based sectors. . . .

We must be especially mindful that our scientific and technological base—the "seed corn" of our economic and military future—can become a major asset of our foreign competitors. I am talking about the internationalization of our science and engineering education enterprise—that is, foreign investment in our universities, especially our research institutions. First full professorships, then individual laboratories, and now entire departments at highly regarded American universities are being underwritten by overseas competitors who are eager to gain access to our base of advanced knowledge.

It is understandable that our universities are entertaining these offers of support. The offers are generous

and tempting—especially at a time when we are under tremendous pressure to restrain our federal government's spending and when our corporations are looking for ways to trim their own expenditures.

I know that university officials carry the heavy responsibilities of making their institutions world-class organizations—and that takes funding and lots of it. The near-term benefits to these institutions are enticing—but the long-term national implications of foreign investment in our universities are staggering.

In fact, we now seem to be running a huge trade surplus in one area that perhaps we shouldn't be—that is, science and engineering education, a very precious commodity

There are signals of cracks in the nation's technology infrastructure that, if not addressed, will severely undercut our ability to maintain our economic and military security. They will limit our flexibility to develop and use new technologies to generate the wealth necessary to meet our own social needs and to contribute to the well-being of other nations. In turn, that would gradually limit our political leadership and international competitiveness. We must heed these signals and work together to improve our competitiveness. . . .

We must—and I believe we can—find ways to ensure that technology draws the world closer together and that technology is put to work for global welfare. But first we must come to grips with the reality that we have compelling national interests, even in this age of global technology.

US Study Says Japan Seeks Marine Biotech Lead

Japan has decided that marine biotechnology will be a major economic factor in the 21st century, and it is mobilizing extensive resources to become the world leader in research and applications. That's the gist of a new report prepared by a US team that visited Japan last September to study yet another field in which the affluent and apparently and well-orchestrated Japanese research enterprise is aiming to be tops.

The report, *Marine Biotechnology in Japan*, was sponsored by the National Science Foundation and the National Oceanic and Atmospheric Administration. It was written by David Attaway, Assistant Director of NOAA's National Sea Grant College Program; Akira Mitsui, of the University of Miami School of Marine and Atmospheric Science, and Oskar Zaborsky, who was President of OZCOM International at the time of the study and who has since become Director of the Board on Biology at the National Academy of Sciences.

The report estimates that Japanese industry, government agencies, and universities are planning to spend about \$200

million on marine-biotechnology research over the next decade. The major organizations involved, the report states, are the Japanese Ministry of International Trade and Industry (MITI) and 24 industrial partners that have teamed up to provide \$189 million over the next decade for support of two institutes.

In addition, the report continues, the Ministry of Agriculture, Forestry and Fisheries is supporting a third institute. "The research at the institutes is expected to be both long-term and fundamental in nature and will focus on new technologies to use marine organisms and to produce useful substances."

In a concluding section, the report states: "Marine biotechnology represents perhaps the last great scientific frontier in biotechnology for the rest of this century and the 21st century to come—a view totally shared by MITI and other Japanese organizations."

Marine Biotechnology in Japan (29 pp., no charge), order from: NSF, Office of International Programs, Room 1214, 1800 G St. NW, Washington, DC 20550; tel. 202/357-9632.

More In Print: Student Math, Engineering's Top 10

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Quantum: The Student Magazine of Math and Science (quarterly, 59 pp., \$9.95 per year; free copy upon request), a new publishing venture derived mainly from translation of the Soviet student magazine *Kvant*. The English version, in a slick, well-illustrated format, is a joint production of the Soviet Academy of Sciences and the US National Science Teachers Association in cooperation with the American Association of Physics Teachers and the National Council of Teachers of Mathematics, with support from NSF.

Order from: National Science Teachers Association, 1742 Connecticut Ave. NW, Washington, DC 20009-1171; tel. 202/328-5800.

Physics News in 1989 (53 pp., \$5 for one, \$3 per copy for 10-20; \$2 per copy for over 20), the 21st annual roundup selected and prepared by constituent societies of the American Institute of Physics, this is the first published as a separate booklet and not as a supplement to *Physics Today*. The once-over-lightly treatment gives the basics on recent developments in a dozen fields of physics.

Order from: Public Information Division, American Institute of Physics, 335 East 45th St., New York, NY 10017; tel. 212/661-9404.

Engineering and the Advancement of Human Welfare: Ten Outstanding Achievements, 1964-1989 (48 pp., \$8.95 each; discounts for multiple orders), professional chest thumping by the National Academy of Engineering (NAE) on the occasion of its 25th anniversary last December. NAE says the top 10 were culled by its Council from 340 suggestions. The winners are: the moon landing, application satellites, the microprocessor, computer-aided design and manufacturing, computerized axial tomography (the CAT scanner), advanced composite materials, the jumbo jet, lasers, fiber-optic communication, and genetically engineered products. In slick magazine format, colorfully illustrated, the top-10 treatment is gimmicky and superficial. An announcement from the Academy says 20,000 complimentary copies will be sent to high school students, guidance counselors, etc.

Biosafety in the Laboratory: Prudent Practices for the Handling and Disposal of Infectious Materials (222 pp., \$29.95), by the National Academy of Sciences (NAS) Committee on Hazardous Biological Substances in the Laboratory, chaired by Edward A. Adelberg, Yale University, says that occupational health risk to the 500,000 or more workers in labs in the US "is actually much lower than is popularly perceived to be." But the report says that the risks nonetheless require training against hazards, immunization, and protective systems.

Also available are previous NAS publications on laboratory safety: *Prudent Practices for Handling Hazardous Chemicals in Laboratories* (1981) and *Prudent Practices*

for Disposal of Chemicals from Laboratories (1983), \$19.95 each.

Order from: National Academy Press, 2101 Constitution Ave. NW, Washington, DC 20418; tel. 334-3313 or 1-800-624-6242.

Project on Scientific Fraud and Misconduct, (Reports on Workshops No. 2, 162 pp., and No. 3, 252 pp., no charge), from meetings in 1988 and 1989 by the Conference of Lawyers and Scientists, a joint organization of the American Association for the Advancement of Science and the American Bar Association. The meetings, staked by the Sloan Foundation, were the occasion for yet further gatherings of what has developed into a coterie of circuit riders on the fraud and misconduct issue. Report No. 2 presents papers focused on university procedures for dealing with nasty allegations; No. 3 is on legal aspects of scientific delinquency. Report No. 1, aimed at defining the issues, was published last year and the supply is reported to have run out, but the others are available.

Order from: AAAS, Directorate for Science and Policy Programs, 1333 H St. NW, Washington, DC 20005; tel. 202/326-6600.

University of Chicago School Mathematics Project, Autumn 1989 (19 pp., no charge), description of perhaps the largest and most heavily financed effort to enhance mathematics teaching in an urban school system. Started in 1983, the Chicago program is supported by the Amoco Foundation, Ford Motor Co., Carnegie Corporation, NSF, the General Electric Foundation, GTE Corporation, and Citicorp/Citibank.

Order from: UCSMP, University of Chicago, Judd Hall, 5835 S. Kimbark Ave., Chicago, Ill.; tel. 312/702-1130.

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In Print: '90 Budget Finals, Report on OSTP, Etc.

The publications listed are obtainable as indicated—not from SGR.

Research and Development Funding: FY 1990 (16 pp., no charge), a welcome arrival after the confusing Gramm-Rudman turmoil at the end of the last Congress: a final report on R&D appropriations for the current fiscal year (which began last October 1), produced by the Science Policy Research Division of the Congressional Research Service (CRS), part of the Library of Congress. Compiled by the Division's Research and Development Team, headed by Michael E. Davey, the report covers the 11 federal agencies that provide 99 percent of federal R&D spending. Brief analyses of trends and priorities accompany the budget numbers.

Also from the CRS Science Policy Research Division: **White House Office of Science and Technology Policy: An Analysis** (93 pp., no charge), an update and expansion of the Division's last look at White House science advice, in February 1988. The new report, by Genevieve J. Knezo, Specialist in Science and Technology, examines OSTP's structure and performance by quoting extensively from numerous press and scholarly reports, along with Congressional testimony and comments of scientific figures and others. The weight of commentary is that OSTP sank pretty low in the federal hierarchy in the final years of the Reagan Administration. Though just issued, the CRS analysis deals mainly with OSTP history prior to the arrival in August of the present Director, D. Allan Bromley. Too early for scoring his tenure.

Order from: Science Policy Research Division, Congressional Research Service, Library of Congress, Madison Building, Washington, DC 20540; attn. Ms. Raap; tel. 202/707-7014.

The National Action Plan on Superconductivity Research and Development (71 pp., no charge), another of those minimalist White House sci-tech reports grudgingly produced under pressure from Congressmen who say US strength is being frittered away by the Administration's

indecisiveness on the government's proper role in industrial research. Mandated by the Superconductivity and Competitiveness Act of 1988, a Democratic measure opposed by the Reagan White House as unneeded, the report was largely prepared by the Office of Science and Technology Policy. It is cheerfully titled "The National Action Plan," but consists mainly of an inventory of ongoing research activities, praise for the existing government role, and cheers for the Administration's proposals to raise the NSF budget, cut the capital gains tax and retain the Research and Experimentation Tax Credit (which the last Congress extended to the end of 1990.) Stated but not examined critically in the "action" report is a threadbare theme: "Government can act as a catalyst in bringing together the expertise of the national laboratories, universities, and industry in partnership" but "The Nation's success in commercializing superconductivity ultimately depends on the private sector, which must make the critical decisions on how much capital, time, and effort to invest."

Order from: National Critical Materials Council, Room 5026, New Executive Office Building, 725 17th St. NW, Washington, DC 20506; attn. Ms. Chuckerel; tel. 202/395-7200.

Accountability in Research: Policies and Quality Assurance (quarterly, 82 pp.; per year: \$134, corporate; \$90, academic; \$56, individual; free copy on request), apparently the first periodical spawned by the recent flurry of political and institutional concern over fraud, sharp dealing, and other hanky-panky in the scientific community. Edited by Adil E. Shamoo, Department of Biological Chemistry, University of Maryland School of Medicine, Baltimore, the first issue draws heavily on papers presented at a conference in May 1988 at the University of Maryland on Scientific Data Audit, Policies, and Quality Assurance—quite a time lag for a fast-moving public issue. The worse news is that "Some papers appearing in subsequent issues will be drawn from the same conference." It could get better after that.

Order from: Gordon and Breach, Marketing Department, PO Box 786, Cooper Station, New York, NY 10276; tel. 212/206-8900.

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